

# PROJECT STATEMENT

STATE: DELAWARE

GRANT: W35R-11

GRANT TITLE: WILDLIFE INVESTIGATIONS – WHITE-TAILED DEER

JOB SCHEDULE: OCTOBER 1, 2009 – SEPTEMBER 30, 2010



**State: Delaware**

**Grant Number and Title:**

W 35 R – Wildlife Investigations: White-tailed Deer

**Objective:**

To maintain a healthy and viable deer herd and minimize human/deer conflicts.

**Job Number and Title:**

Job 1. White-tailed Deer Mortality Evaluation

**Job Objectives:**

To determine the number of deer harvested, harvest distribution, general health and condition of the herd and age and sex ratios.

To evaluate road kill and other non-hunting mortality.

**Activity:**

The 2009/10 deer season provided hunters with 131 days of hunting opportunity beginning September 1, 2009 and ending January 31, 2010. Archery hunters were allowed to hunt during this entire period, excluding Sundays. Muzzleloader hunters had an 8-day October season and a 6-day January season, but were also allowed to use that weapon during the designated shotgun seasons. Shotgun hunters had an 8-day November season and a 7-day January season as well as an 8-day October antlerless and 7-day December antlerless deer season. Furthermore, handgun hunters had a 7-day season in January but could also use these firearms during any of the shotgun deer season. Additionally, youth hunters had a 1-day special hunt in the Saturday preceding the first Saturday of the November Shotgun Season. All seasons were open statewide.

License and tagging requirements were again gender specific in Delaware during the 2009/10 season. Only antlerless deer could be taken on the general hunting license tags and 2 of those had to be females (does). A Hunter's Choice combination tag and a Quality Buck tag could be purchased (1 set/hunter) by Delaware residents for \$10. A Hunter's Choice tag allows a hunter to take 1 deer of their choice (antlered or antlerless) and the Quality Buck tag could be used to tag a buck with a minimum outside antler spread of at least 15 inches. For \$25 each, non-residents could purchase an antlered deer tag (could be used on a buck with antlers of any size) as well as a separate Quality Buck tag. The purpose of the Quality Buck tag is to allow hunters to take a second antlered buck without putting additional pressure on yearling males. Additional antlerless deer tags were also available for hunters to purchase for \$10 each. In areas with significant crop damage, hunters could use special antlerless deer damage tags on lands enrolled in either the Delaware Deer Damage Assistance Program (DDAP) or the Delaware Severe Deer Damage Assistance Program (SDDAP).

Unlike previous years, private businesses throughout the state were not available to register hunter harvested deer. All deer were required to be registered using the free phone or internet registration systems. This change was made for three reasons; financial savings, time savings from having to enter the previously collected handwritten harvest information into a

computer; and the acquisition of more timely harvest data. Throughout the year, deer killed by motor vehicles were tagged and reported by state or county police and/or Division field personnel. Furthermore, the Delaware Department of Transportation (DelDOT) recorded the number of deer they collected from roadways.

The data provided by hunters through the electronic registration system provides general harvest information (e.g. harvest location, deer gender, type of tag, and weapon used), but not detailed biological information (e.g. age, field dressed weights, and antler measurements), which is important when trying to evaluate the health and composition of the herd. Therefore, the Division has established biological harvest data collection stations at deer processors across the state and periodically collects this biological data every few years. During the 2009/10 season, no biological was collected.

### **Target Date:**

September 30, 2010 - Note: per U.S Fish and Wildlife Service approval this target date has been extended to September 30, 2011.

### **Status:**

On schedule – per approved extension

### **Remarks:**

#### **Deer Harvest Mortality Evaluation**

The 2009/10 overall deer season resulted in a reported 6<sup>th</sup> all-time harvest of 12,400 animals. This was down 11.0% from the 2008/09 season (13,926 deer). The actual cause of this decline cannot be certain but the two most likely causes were a reduced deer population due to aggressive doe harvests the preceding years and poor weather. Two nor'easter storms struck Delaware during the two most popular and productive seasons (October Muzzleloader and November Shotgun). These storms dumped so much rain on The First State that hunter effort was drastically reduced, which subsequently resulted in reduced harvests. Additionally, Delaware experienced severely unusual snowfall amounts in January, which further inhibited hunter effort during the later part of the season. In regards to effort concerning the number of licensed hunters, there were approximately 16,000 hunters that pursued white-tailed deer during the 2009/10 season. This number of hunters in Delaware has remained relatively constant in recent years.

Delaware is divided into 17 deer management zones (DMZ) (Figure 1). The deer harvest is analyzed on a zone basis. Harvest by deer management zone for the 2008/09 and 2009/10 seasons is shown in Table 1. Public lands accounted for 13.4% of the total statewide harvest (Table 2). The effort to reduce the number of deer harvested from “unknown” zones was continued this year and this number of unknown zone harvest was reduced by 76% (Table 1).

In addition to the standard license tags, Delaware has five special tags which hunters can use to harvest extra deer (\$10 antlerless tags, quality buck tags, hunter's choice tags, non-resident buck tags, and antlerless deer damage tags). Deer taken on these special tags made up 44.9% of the total harvest during the 2009/10 season (Figure 2).

A key element of successful deer management is the management of the female portion of the population. Careful regulation of the doe harvest can allow herd size to increase, decrease, or remain stable. From 1954 to 1995, Delaware maintained an either sex deer hunting option

with no restrictions. During the late 1970's, and throughout the 1980's the percentage does in the harvest fluctuated between 30 – 40%, with a noticeable declining trend between 1983 through 1988. During these years however, the overall deer harvest increased steadily, as did complaints regarding crop damage and destruction of landscaping in suburban areas. In 1990, the Delaware General Assembly passed legislation allowing the Division of Fish and Wildlife to sell special antlerless deer tags for use in areas where deer damage was occurring. Between 1990 and 1995, significant deer season liberalizations were implemented and the use of antlerless tags was expanded greatly. While the deer harvest continued to increase, the percentage of does in the harvest still did not exceed 40% (Figure 3). By 1995, damage complaints had reached an all time high. In an effort to harvest more female deer, the Division changed the 1996 license deer tag structure from 2 either sex tags to 1 antlerless only tag and 1 hunter's choice tag. In that same year, the December antlerless season was expanded from 2, to 6 days. To further promote the harvest of female deer, free antlerless deer damage tags were made available to farmers having documented deer damage and enrolled in the DDAP. These measures resulted in a statewide harvest consisting of 50% female deer. In 2002, the license deer tags were converted to two antlerless tags. To harvest an antlered buck, hunters had to purchase a hunter's choice tag.

To further promote the harvest of female deer, the Division also altered its deer season structure. In 2004, 8 additional antlerless gun days were added in October and 2 doe tags were added to the hunting license. Due to continuous complaints regarding crop damage from deer, in late August 2006 the Division created the Severe Deer Damage Assistance Program (SDDAP). Those enrolled in this program are allowed to harvest antlerless deer from August 15 through May 15. Past experience has shown that the use of antlerless deer damage tags within the original DDAP, have been effective in increasing the number of does in the total harvests.

The percentage of does in the 2009/10 harvest was 53.4% statewide, similar to the 2008/09 harvest (Figure 3). The 2001/02 season was the first season in which more female deer were harvested than males with the percentage of females in the total harvest peaking during the 2004/05 season, in which nearly 58% of the harvest was female. Since then, the percentage of does has slowly decreased but has still remained above 50%. This decline will be monitored and evaluated over the coming seasons, as will sex ratio data on a zone basis, with regulations being reviewed and adjusted as needed in response to management goals.

### Road Kill and Disease Surveillance

Along with hunter harvest mortality, the Division monitors other sources of mortality (e.g. vehicle collisions and disease). Deer that have been struck by an automobile may be legally possessed provided an individual obtains a Vehicle Killed Deer Tag which are provided by the Division to state, county, or city enforcement officers for issuance. During this segment, 68 of these tags were provided to Delaware motorists. Additionally, the Delaware Department of Transportation (DelDOT) keeps track of the total number as well as the gender of each deer killed by an automobile and removed from a primary Delaware roadway. In 2009, 1,062 deer were removed by DelDOT, with the largest proportion being comprised of adult does (Table 3).

Regarding deer disease, Epizootic Hemorrhagic Disease (EHD) is annually the most common disease that impacts the Delaware deer population, even then, the impacts are minimal. Last year was a mild to normal year concerning EHD outbreaks in Delaware as the conditions were not ideal for an outbreak to occur. Delaware tends to have outbreak problems during dry summers preceded by a mild winter. These conditions were not present in 2009 and as a result

a single antlered buck was reported to the Division in which the likely cause of death was EHD, i.e., deer was found dead in late summer, near water, which is very typical of our EHD cases. During the 2009/10 season, Division personnel collected CWD samples at deer processors during the October Muzzleloader and November Shotgun Seasons. A few samples were also collected from animals that exhibited symptoms of CWD throughout the year. In total, 592 samples were collected and all tested negative for the presence of CWD prions.

**Recommendations:**

This job should be continued. The annual deer harvest continues to remain high, as have deer damage complaints, although their numbers seem to have begun to decline. Continuous monitoring is essential for sound management of the herd.

**Prepared by:**

Joe Rogerson  
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**Reviewed by:**

Rob Hossler  
Program Manager – Game Species

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Table 1. The total number of white-tailed deer harvested within each of the 17 Delaware Deer Management Zones during the 2008/09 and 2009/10 seasons and the difference between seasons.

Deer Management Zone	2009/09 Season	2009/10 Season	Difference	Percent Change
1	1,231	1,360	129	10.5%
2	597	645	48	8.0%
3	599	582	- 17	- 2.8%
4	457	484	27	5.9%
5	558	629	71	12.7%
6	826	749	- 77	- 9.3%
7	1,146	1,068	- 78	- 6.8%
8	620	569	- 51	- 8.2%
9	831	767	- 64	- 7.7%
10	486	463	- 23	- 4.7%
11	1,356	1,094	- 262	- 19.3%
12	793	707	- 86	- 10.8%
13	550	553	3	- 0.1%
14	724	609	- 115	- 15.9%
15	766	670	- 96	- 12.5%
16	1,120	837	- 283	- 25.3%
17	412	405	- 7	- 1.7%
Unknown <sup>1</sup>	854	209	- 645	- 75.5%
Total	13,926	12,400	- 1,596	- 11.0%

<sup>1</sup>Consists of deer that were harvested and the deer management zone was not indicated.

Table 2. The total number of white-tailed deer harvested on each of the areas open to public hunting during the 2009/10 season.

Public Area	Total Harvest
<b>National Wildlife Refuges</b>	
Bombay Hook NWR	57
Prime Hook NWR	70
<b>State Forests</b>	
Blackbird SF	128
Redden SF	198
Taber SF	19
<b>County &amp; State Parks</b>	
Brandywine Creek SP	31
Cape Henlopen SP	50
Delaware Seashore SP	25
Fort Delaware SP	18
Fort DuPont SP	0
Holts Landing SP	3
Killen Pond SP	1
Lums Pond SP	38
Trap Pond SP	29
White Clay Creek SP	132
<b>Industrial Forest Lands</b>	
Industrial Forest Lands	22
<b>Wildlife Areas</b>	
Assawoman WA	65
Augustine WA	38
Blackbird Reserve WA	2
Blackiston WA	15
C&D Canal WA	117
Cedar Swamp WA	39
Little Creek WA	37
Marshy Hope WA	6
McGinnis Pond WA	0
Midlands WA	31
Milford Neck WA	47
Nanticoke WA	30
Norman G. Wilder WA	60
Old Furnace WA	26
Prime Hook WA	21
Ted Harvey WA	25
Urban/Fortney Tracts	3
Woodland Beach WA	23
<b>Unknown</b>	<b>258</b>
<b>Total</b>	<b>1,406</b>

Table 3. The total number deer, separated by gender and age, of white-tailed deer removed from primary and secondary roads in Delaware by the Delaware Department of Transportation each month in 2009.

	<b>Adult Doe</b>	<b>Fawn Doe</b>	<b>Button Buck</b>	<b>Spike Buck with Both Antlers &lt; 3"</b>	<b>Antlered Buck</b>	<b>Shed Buck</b>	<b>Unknown</b>	<b>Monthly Total</b>
<b>January</b>	26	5	4	0	2	0	9	46
<b>February</b>	40	6	5	0	7	1	9	68
<b>March</b>	39	2	5	0	8	0	9	63
<b>April</b>	47	3	6	0	6	2	6	70
<b>May</b>	61	9	4	0	7	4	5	90
<b>June</b>	62	15	2	0	37	0	9	125
<b>July</b>	31	7	3	0	17	0	10	68
<b>August</b>	10	12	1	0	6	0	4	33
<b>September</b>	27	13	3	0	11	0	16	70
<b>October</b>	42	14	13	0	47	0	15	131
<b>November</b>	73	18	22	0	85	0	31	229
<b>December</b>	41	5	4	0	9	0	10	69
<b>Total</b>	499	109	72	0	242	7	133	1062



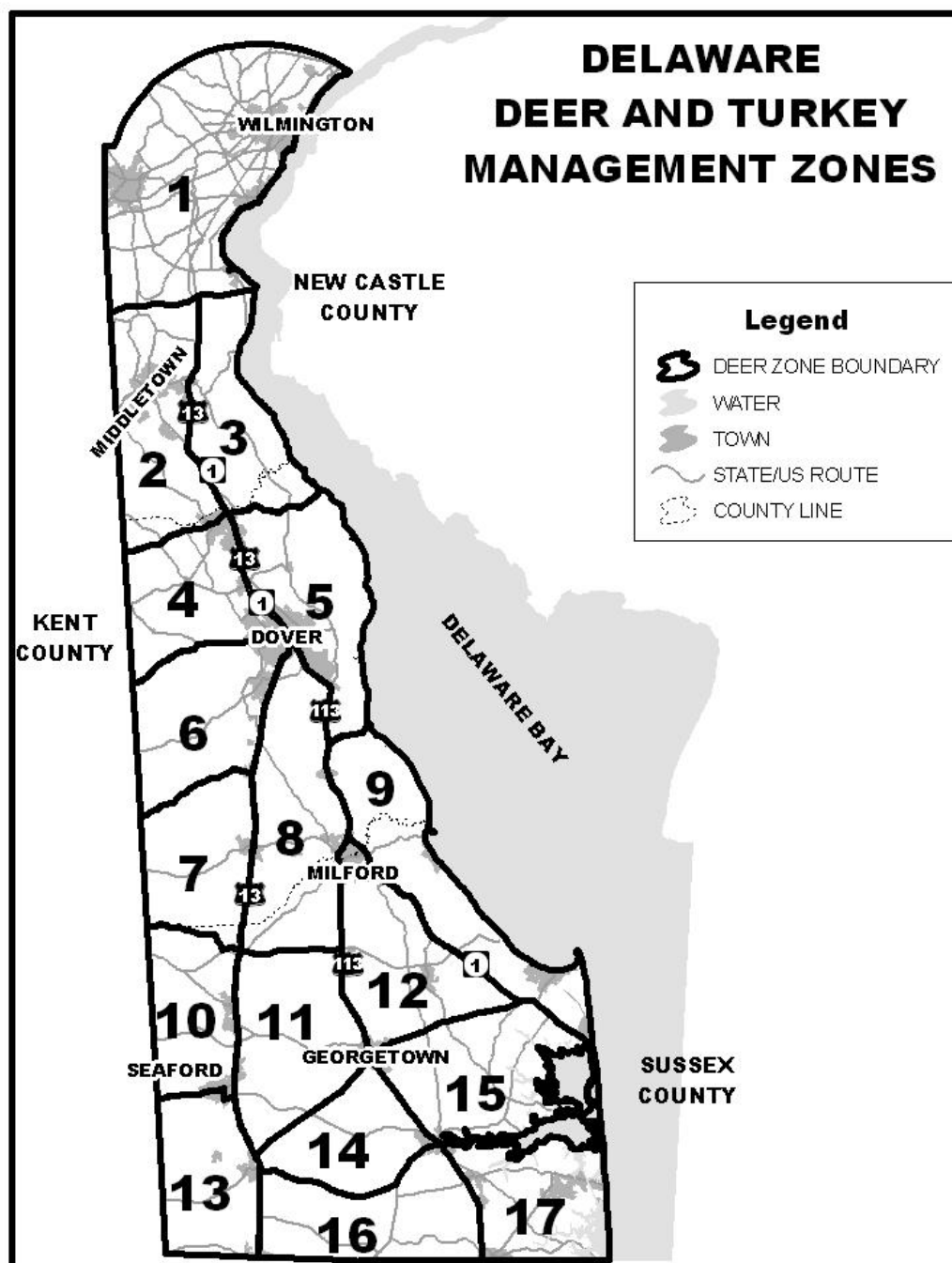


Figure 1. Map outlining the boundaries of the 17 White-tailed Deer Management Zones within Delaware.

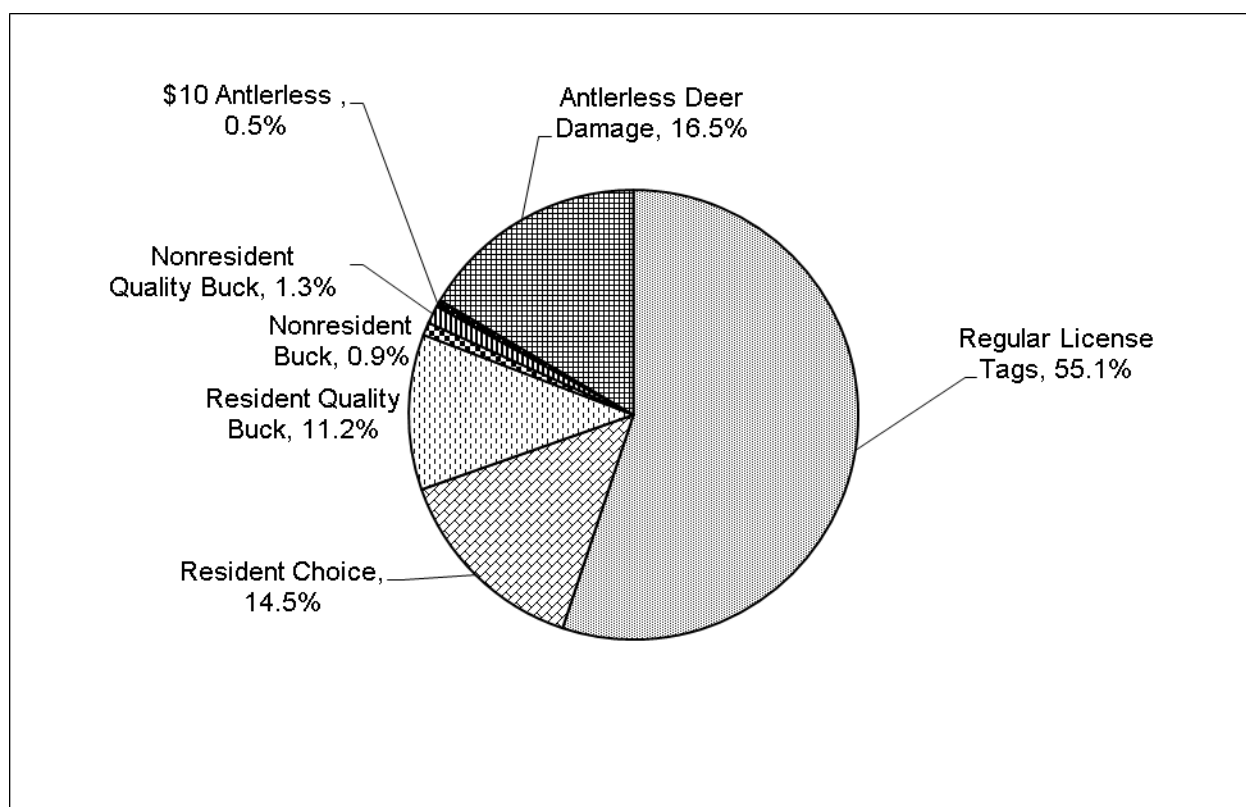


Figure 2. The percentage of special deer tags compared to regular license tags used by Delaware hunters during the 2009/10 deer hunting season. Special tags are comprised of hunter's choice tags, quality buck tags, non-resident buck, \$10 additional antlerless deer tags, and antlerless deer damage tags.

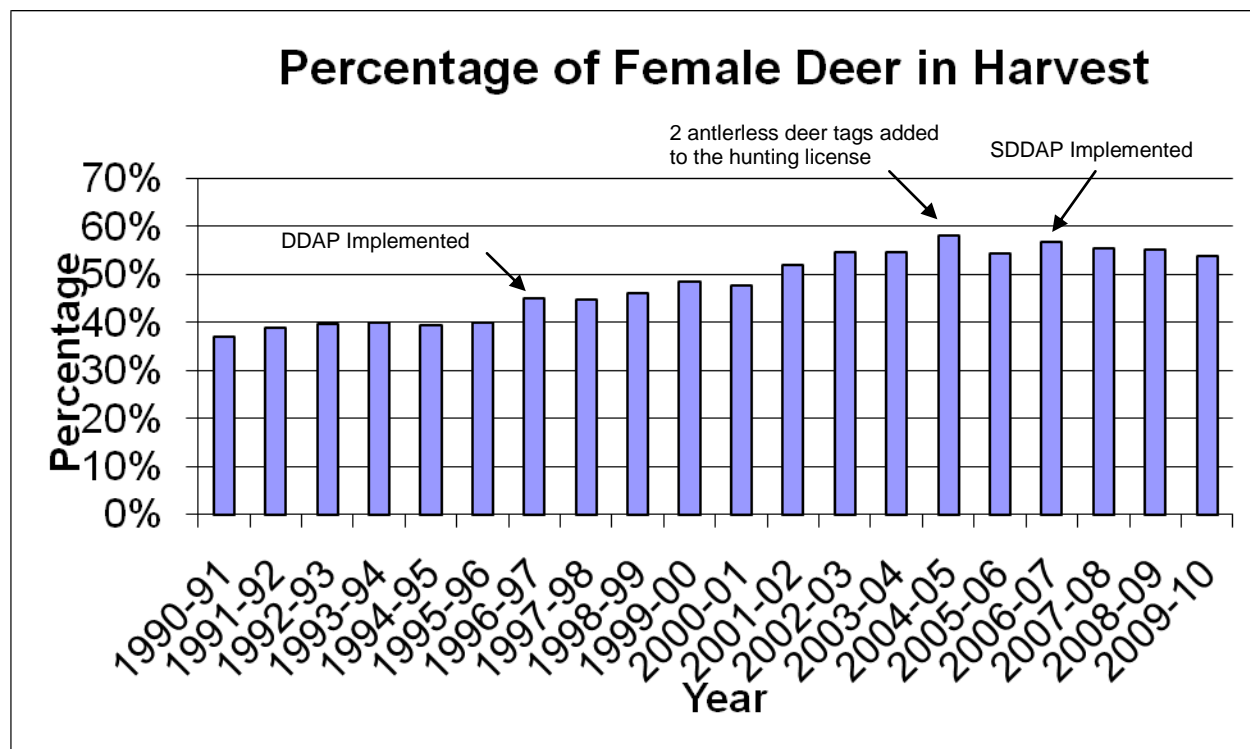


Figure 3. The percentage of female white-tailed deer in Delaware's total harvest from 1990/91 through the 2009/10 season.

**STATE:** Delaware

**GRANT NUMBER AND TITLE:**

W 35R – Wildlife Investigations: White-tailed Deer

**OBJECTIVE:**

To maintain a healthy and viable deer herd and minimize human/deer conflicts

**JOB NUMBER AND TITLE:**

Job 2 – White-Tailed Deer Population Ecology Monitoring and Evaluation.

**JOB OBJECTIVE:**

To determine white-tailed deer population size, demographics (i.e. bucks/doe, fawns/doe), antler cycles, survival, movement rates, and environmental impacts.

**ACTIVITY:**

***Deer Movement and Survival Research:***

Female white-tailed deer were monitored via radio telemetry to investigate survival and spatial and temporal use of the landscape in the Delaware, specifically Sussex County, Delaware. This research should elucidate the impact of public lands for providing refuges to deer for protection from harvest on adjacent private lands.

We trapped deer between 14 December 2009 and 6 May 2010 and captured 47 deer (1 deer in a Clover trap, 2 deer via dart gun, and 44 deer under drop nets). All capture deer received ear tags and we equipped 22 adult female deer with radio collars. We have documented 7 mortalities, 2 between December 2009 and August 2010 (a juvenile male by killed a vehicle and an adult female from capture myopathy) and 5 during September (4 of which were radio-collared females). The mortalities in September were caused by archery harvest (n = 3), unknown harvest (n = 1)), and natural causes (n = 1). We collected 2,434 telemetry locations (Day, n = 1,261; Night, n = 1,173) for 21 adult female white-tailed deer from 1 May 2010 through 31 August 2010.

We used the fixed kernel method using the least-square cross validation (LSCV) as a smoothing parameter for estimating 95% home ranges and 50% core areas. Average home range size during crop season (1 May 2010 – 31 August 2010) was 117 ha and average core area was 19 ha. The average daytime home range size was 110 ha and core area size was 56 ha. The average nighttime home range was 116 ha and core area size was 20 ha. Average overlap of daytime core area and nighttime core area was 25%.

**TARGET DATE:**

September 30, 2010 - Note: per U.S Fish and Wildlife Service approval this target date has been extended to September 30, 2011.

**STATUS:**

On schedule- per approved extension. Additionally, because the project began a year late, we will need to extend the project by at least one year.

**REMARKS:**

Excessive snowfall stopped trapping operations for approximately 6 weeks throughout the month of February and into March. Due to the large amount of snowfall we were unable to reach our goal of 30 radio collared adult females for the trapping season. During our first season (1 May 2010 – 31 August 2010) we collected approximately 40 telemetry locations per month utilizing 3 undergraduates from the Science and Engineering Scholars program. We plan to initiate our second trapping season in December 2010 with the goal of radio collaring 30 additional adult female deer.

**RECOMMENDATIONS:**

This job should be continued

**PREPARED BY:**

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**REVIEWED BY:**

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Program Manager – Game Species  
Delaware Division of Fish & Wildlife

**Job Number and Title:**

Job 3. White-tailed Deer Management Plan

**Job Objectives:**

Create a formal plan related to deer management in Delaware. This plan will serve as the guiding document into “how” and “why” deer are managed in Delaware. We will utilize harvest data, population data, and feedback from various stakeholder groups to formulate objectives and goals that will direct the Division’s efforts related to deer management.

**Activity:**

To help solicit feedback from the general public, a 20-member advisory committee representing numerous deer stakeholders groups was formed. This group met on three occasions (June, July and August 2008) to discuss current deer management issues and goals. In an effort to eliminate Division bias, these meetings were facilitated by outside representation, Douglas Hotton, retired Maryland Deer Project Leader. The information gathered at these meetings was incorporated in the development of Delaware’s formal Deer Management Plan. In addition to these stakeholder meetings, the Division held four meeting in which the general public was able to provide opinions and comments regarding the management of deer. These meetings were held in February and March 2010, with at least one in each of Delaware’s three counties. Individuals unable to attend one of these meetings could also mail or submit comments electronically through the Division’s website. Much of this grant period was spent collecting comments from the general public and developing and writing this document which was completed in May 2010 (see attached document). The Division had 75 bound copies of the plan printed and copies were distributed to pertinent Division personnel, the stakeholder committee members, Fish and Wildlife Advisory Council members, and members of the general public that requested a copy. This document is also available to the public as a .pdf file which can be found on the Division’s website.

Now that the formal plan is completed, the Division now plans to create a shorter (< 10 page) summary version of the Deer Plan. This document will be more user-friendly to the general public and will hopefully be more likely to be read by them. After reading the summary version, if someone wants more detailed information they can review the entire 100+ page document. With as much time and effort spent creating the formal plan, we want as many people possible to understand how/why deer will be managed in Delaware over the next ten years. A summary version should help to accomplish this goal.

**Target Date:**

September 30, 2010 - Note: per U.S Fish and Wildlife Service approval this target date has been extended to September 30, 2011.

**Status:**

On schedule – per approved extension

**Remarks:**

Previously, a formal deer management plan did not exist for Delaware. That's not to say the Division didn't have a "plan" concerning deer management but the goals and objectives were never clearly defined in a written context. As a result, many of the Delawareans didn't know why the Division was making certain decisions pertaining to deer management. Therefore, the Division decided to create a formal Deer Management Plan so that its goals and objectives were clearly defined. Data used to support management decisions as well as the views and opinions of Delawareans will be included in the plan. Once completed, the document should create a stronger relationship between the Division, deer hunters, agricultural users, and non-consumptive outdoor recreationalists, as all of these groups were involved with the creation of this document. Furthermore, having clearly defined goals and objectives will help the Division's management efforts and improve monitoring efforts.

**Recommendations:**

This job should be continued as the Deer Management Plan will guide the Division's efforts concerning deer management over the next ten years.

**Prepared by:**

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**Reviewed by:**

Rob Hossler  
Program Manager – Game Species

**State: Delaware****Grant Number and Title:**

W 35 R – Wildlife Investigations: White-tailed Deer

**Objective:**

To maintain a healthy and viable deer herd and minimize human/deer conflicts.

**Job Number and Title:**

Job 4. White-tailed Deer Density Impacts

**Job Objectives:**

To determine the ecological carrying capacity and impacts associated with different deer densities within varying habitats in Delaware and to determine the deer densities needed to maintain forest regeneration and plant species diversity.

**Activity:**

During this grant period, three areas (Taber and Redden State Forests and Prime Hook National Wildlife Refuge) were selected for exclosures based on habitat types, estimated deer densities and their lack of annual variability associated with hunter harvest. Specific blocks of habitat within each of these areas were delineated and ground-truthed for spotlight surveys. The sizes of these blocks are approximately 3 mi<sup>2</sup> and centered on the proposed exclosure locations. This block size was determined based on estimates of the mean annual home range of deer on the Delmarva Peninsula (Rhoads 2006). Private landowners within the delineated areas were contacted for access and permission to spotlight and permits were obtained for similar activities from the Delaware Forest Service and the USFWS. Spotlighting was planned for February 2010; however, record snowfalls in February and March cancelled these activities.

**Target Date:**

September 30, 2010 - Note: per U.S Fish and Wildlife Service approval this target date has been extended to September 30, 2011.

**Status:**

On schedule- per approved extension; however, since the spotlighting activities were cancelled in February 2010 due to record snowfalls, there has been limited work on this project due to staff limitations and assignment changes. It is currently unknown if spotlight surveys will be completed during February 2011, so that exclosures can be constructed in the spring of 2011.

**Remarks:**

The aerial survey technique used by the Division for estimating deer density has sufficient variability to exclude its use for smaller more defined areas in which exclosures will be



constructed and habitat impacts evaluated. Therefore exclosures will be constructed in deer management zones with the least amount of annual variability (coefficient of variation) associated with hunter harvest, the largest source of population change. Several spotlight surveys of a defined area surrounding each exclosure will be conducted during the late-winter to determine the minimum deer density.

**Recommendations:**

This job should be continued as a cornerstone of the Division's deer management efforts consists of developing ecological carrying capacity estimates; however, sufficient staff time needs to be found to adequately devote to it.

**Prepared by:**

Rob Hossler  
Program Manager – Game Species